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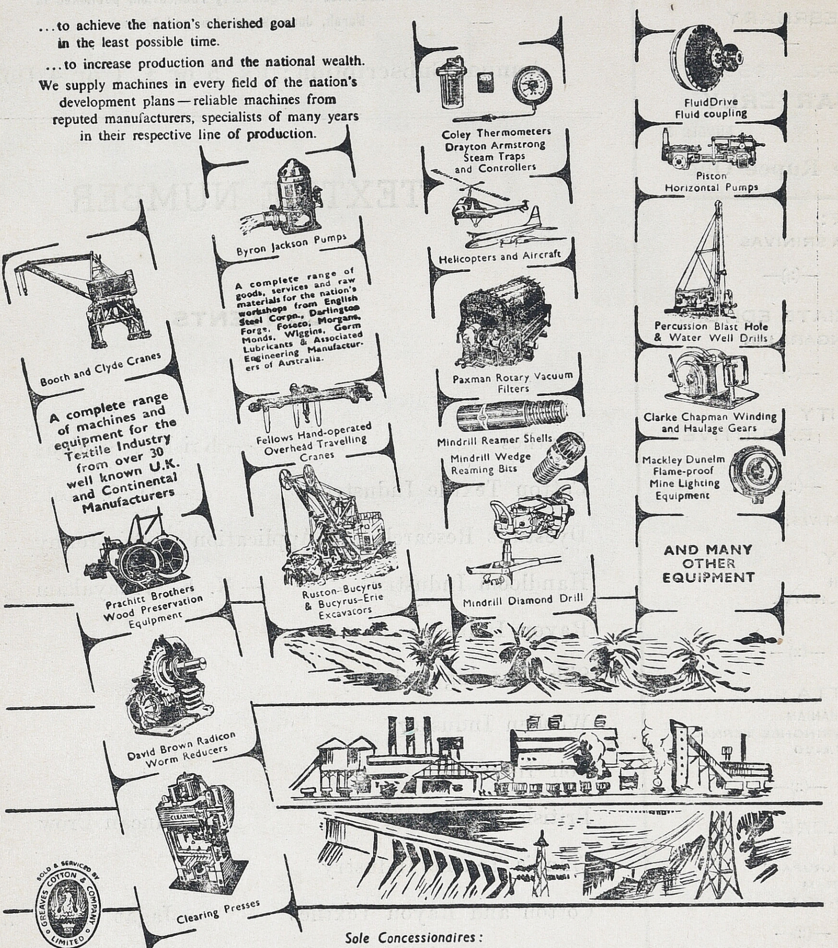

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TEXTILE NUMBER

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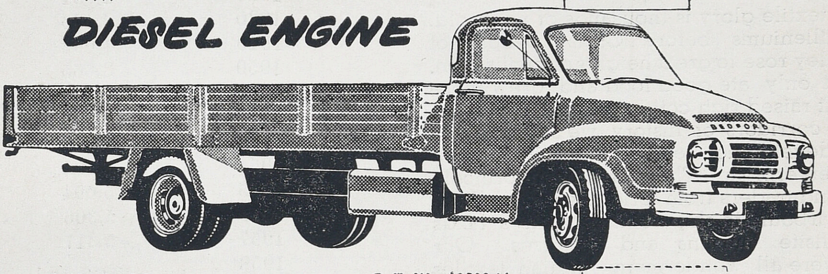

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TEXTILES

The textile Industry is the biggest industry in India. Over eight lakhs of workers live by it. Its annual production is over Rs. 400 crores. Textile industry accounts for more than one-third of the total industrial production of the country i.e., Rs. 400 crores. India occupies a place second only to the United States in cloth production.

Our textile glory is thousands of years old. Many milleniums before Christ people of Indus valley rose to great heights of civilization. They not only ate good food and grew more wheat but raised rich cotton crops. Traversing the long corridors of history, we see Harappa people developing textile industry into a national enterprise. Their skill won princely support and traders from forlorn seas frequented our harbours to ship to their native lands our exquisite muslins and chintzes. Our patrons were all wonderment. Indian textiles held sovereign sway century after century till the dynamic factory industry challenged them.

At Fort Gloster near Calcutta, the first textile mill saw the light of day in 1818. Bombay, which is the natural home of the textile industry in India, did not have the distinction of being the first. Only in 1856 the first textile mill was started in Bombay. Ahmedabad followed suit. By 1866, there were 13 mills. By 1880, 56 with 14,00,000 spindles and 13,500 looms. By 1906, there were 204 mills. By 1914, the number increased to 271. With the termination of the War, more capital flowed into textiles and with the advent of Swadeshi Movement, its destinies guided by Mahatmaji, a tremendous expansion took place. By 1925, there were 337 mills. And by 1955, 461 mills with 1,21,000,000 spindles and 2,07,000 looms. Of these, Bombay had 200 mills.

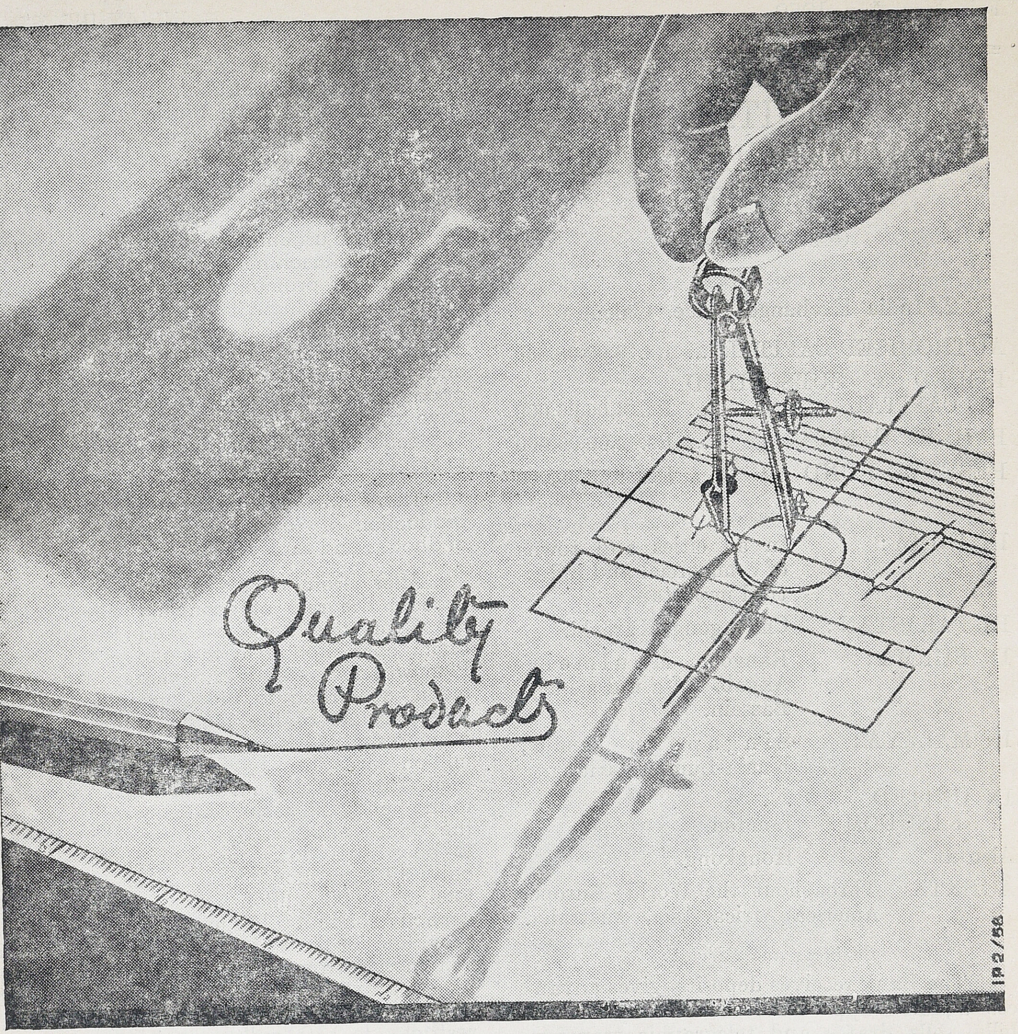
The target of cloth production in the First Five Year Plan was 4700 million yards and this was exceeded.

Cloth output in the mill sector is steadily increasing and India today is world's second biggest producer.

	OUTPUT In million yards
1910	1,043
1920	1,581
1930	2,495
1940	4,092
1950	3,665
1951	4,076
1952	4,599
1953	4,878
1954	4,998
1955	5,094
1956	5,306
1957	5,317
1958	"

Last year the industry had been passing through difficulties since the commencement of the year with heavy accumulation of yarn and cloth and aggravated by a decline in exports. Government by their Resolution of May 29, 1958 appointed a Committee under the Chairmanship of Shri D. S. Joshi, I.C.S., Textile Commissioner, to enquire into the problems relating to this industry. The Committee also consisted of representative industrialists, labour and other interests.

The Committee were requested to undertake a rapid study of the problems of the industry with special attention to the patterns of production, modernisation, management, finance and incidence of different elements in the production cost. They were also requested to make a re-assessment, if necessary, of the phased requirements of cloth and yarn. In particular, their views were sought on the causes for the decline in exports and the measures necessary to arrest such a tendency and to promote exports.



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The Committee came to the conclusion that the excise duty structure needed rationalisation and in advance of their report, they made certain recommendations which were accepted by Government and changes in the excise duty structure were announced on July 4, 1958.

There is urgent need for the replacement of out-dated machinery, rationalisation, modernisation and promoting efficiency in management and productivity of labour. In view of the unmistakable shift in the pattern of consumer demand for cloth of improved quality and in processed condition rather than grey goods of cheaper quality, the industry will have to go in increasingly for the production of bleached, dyed, printed and finished cloth to suit the consumers' taste.

There was a significant increase in the production of "coarse varieties, particularly of dhoties and sarees".

After careful consideration and taking into account the rate of economic development, the Committee have assessed that the *per capita* consumption at the end of the Second Plan will not exceed 17.5 yards. This would mean, according to the Committee, that the three sectors of the textile industry would have to supply for internal consumption 7,000 million yards only by the end of the Second Plan. This would again mean that the allocation to the handloom sector which was to produce the entire additional requirement may have to be pruned down correspondingly to reach only 2,100 million yards against the present total of 1'600 million yards. Rating the mill capacity at about 5,100 million yards and even providing for the additional requirements to be met mostly from the handloom sector, they have felt that the target for expanded production from the handloom sector may have to be restricted to 2,100 million yards.

Dealing with the question of surplus yarn, Government have removed all restrictions on exports and have decided to maintain this policy as a longterm measure for three years in the first instance.

Marketing intelligence or research is an indispensable adjunct. Government accept the recommendations of the Committee about the need for a more continuous and sustained study in the field of marketing intelligence and research for cotton textiles.

The total stocks with the entire trade had shrunk considerably, and to enable normal free movement of stocks, the trade on their part should cooperate by increasing their holdings and relieve to some extent the pressure on the mills by way of accumulations. Even prior to the receipt of the report, Government had taken up with banking system the need for allowing adequate and even liberal credit facilities to the industry.

The Committee observe that the problem of rationalisation in the textile industry has to be solved adequately if the industry has to progress and make full use of the results of technological advancement.

The Commitiee have used the term "rationalisation" to mean a reorganisation in an unit of the industry which ensures elimination of all waste and the most scientific utilisation of men, material and machinery. They have referred to the fact that a large majority of the machines in existence were installed more than 40 years ago, leading to low production, bad quality of products, engagement of a large number of workers and high cost of production.

Government agree with the Committee that every case of replacement will have to be judged on its merits both from the standpoint of the interests of the textile industry.

An Advisory Committee consisting of all interests and having representatives from all the important textile centres should be set up to advise the Textile Commissioner on important matters affecting the working of the units of the Textile Industry as a whole or of any unit in particular.

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The various suggestions made by the Committee in regard to the replacement of old and out-moded machinery, regular surveys, proper and timely advice and relief, financial assistance from the various agencies etc., have been accepted by Government. In the circumstances it should be possible for even the closed mills if they are properly managed to restart working. The steps .proposed to be taken should also help the mills to avoid closure in future.

The intention of Government clearly is to assist the various mills that may be in difficulties, and thus to help to stabilise their position.

Government do not, therefore, consider that in the circumstances as they exist today, the setting up of an autonomous Corporation for the purpose envisaged by the Committee is either necessary or desirable.

The practice in regard to the grant of concessions on the supply of raw materials to Industry varies from State to State and in the implementation of the scheme of replacement of sales tax by the additional duties of excise, it was never contemplated that the State Governments should maintain the *status quo* in regard to these concessions particularly in view of the restrictions placed under Section 14 of the Central Sales Tax Act, 1958.

Adjustment of printing quota to needy mills, relaxation of production control orders and regulation of yarn and cloth production, will be examined and action taken by the Textile Commissioner, in consultation with the Government where necessary, having due regard to the interests of the decentralised sector.

The need for promoting exports of cloth and yarn is constantly engaging the careful attention of Government. Several facilities for import of necessary materials and for the modernisation and rehabilitation of equipment have just been given to exporting mills to enable them to export textiles of high quality.

The problems relating to the industry are manifold and this industry is one of the major industries very susceptible to any changes in the economic climate of the country. A Cotton Textile Consultative Board, with the Minister for Commerce as Chairman, has been set up to provide a forum for consultation with the industry from time to time.

* * *

— Krishna Srinivas

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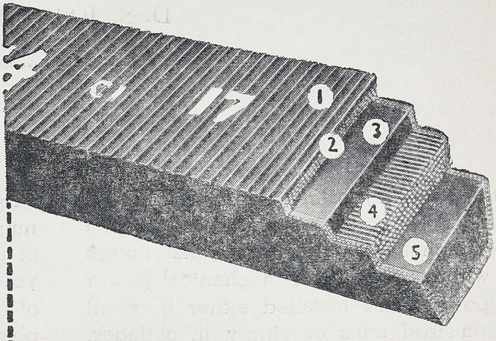

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THE COTTON TEXTILE INDUSTRY

D. S. JOSHI, I.C.S.

Textile Commissioner, Government of India

Cotton weaving is an ancient industry in India and is being done in different sectors in mills which are organized, on handlooms worked without the aid of mechanical power and on powerlooms installed either in small or medium-sized units or singly in cottages. In the magnitude of the capital invested, in the quantum and value of output, in the number of workers employed and in the role played in the national economy, no single organised industry in India can claim greater importance than the cotton textile mill industry. In the mill sector alone, with a paid-up capital amounting to nearly Rs. 115 crores, the industry's output is well over Rs. 400 crores, providing employment to more than 8 lakhs of persons. The industry is the mainstay of many ancillary enterprises and is the principal support to the textile machinery industry which is steadily growing in the country. In the decentralized sector, it is estimated that there are about 2.5 million handlooms producing cotton cloth, and affording economic subsistance for many more families larger in number than the handlooms. The number of powerlooms in the cotton textile sector has yet not been precisely known, but on the basis of available statistics the number may be placed around 27,600 with an estimated production of 200—220 million yards of cloth.

Structure of Industry

The following table gives the number of mills in existence in the country as on January 1, 1958, with the total number of spindles and looms installed :—

No. of Spinning Mills	No. of Composite Mills	Total No. of Mills	No. of Spindles	No. of Looms
175	295	470	13,034,098	201,280

The mill industry is equipped largely with ordinary or Calico looms designed to weave cloth of relatively shorter lengths; and the productive equipment in many mills is old.

Pattern of Production

The pattern of cloth production in the cotton textile mill industry has followed in some degree the equipment available with the industry and in a greater measure the quality of cotton available within the country. About 88 per cent of the industry's requirement of cotton is available within the country itself. A major portion of the cotton grown in the country at present is admirably suited for production of cloth of coarse and medium varieties, although efforts are continually being made to grow more of superior varieties of cotton which can be used in greater production of finer varieties of cloth. The following table will illustrate categorywise production of cloth in the organised sector of the industry:—

(In million yards)

Year	Coarse	Medium	Fine	Superfine	Total
1953	599	3,136	839	304	4,878
% to Total	12.3	64.3	17.2	6.2	
1954	510	3,691	462	335	4,998
% to Total	10.2	73.9	9.2	6.7	
1955	572	3,759	462	301	5,094
% to Total	11.2	73.8	9.2	5.9	
1956	719	3,796	444	347	5,306
% to Total	13.6	71.5	8.4	6.5	
1957	1,163	3,503	383	263	5,317
% to Total	21.9	65.9	7.2	5.0	

Growth of Industry

The growth of the cotton textile mill industry to its present size, especially since 1914, was aided, mostly if not entirely, by the two World Wars, the Swadeshi movement, the gradual elimination of foreign competition as the indigenous industry expanded its production, but overwhelmingly by the expanding internal market for cloth. When the Second World War started, India had 388 cotton mills with about 10 million spindles and 2,00,000 looms. Despite the partition of India in 1947, by 1955 the number of mills rose to 461 with 12.1 million spindles and 2,01,000 looms and today the industry has a total spindleage of 13.05 million and 2,01,280 looms. The comparatively slow increase in the number of looms has been due to the policy of the Government in the matter, with the object of protecting the handloom industry.

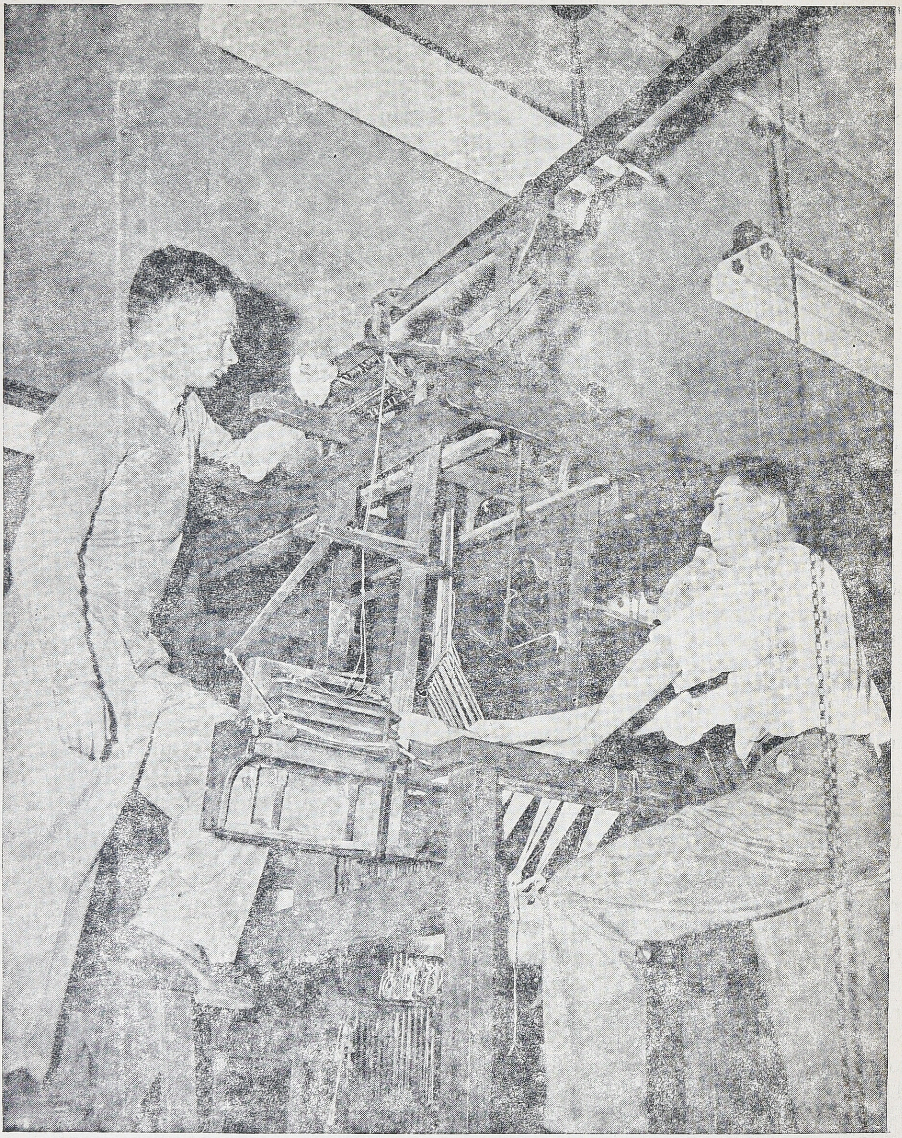
Plan Targets

Under the First Five Year Plan, the target of production was 4,700 million yards for cloth and 1,640 million lbs. for yarn. In actual fact, however, these targets were exceeded well ahead of the close of the Plan period (March 31, 1956).

The production targets for the cotton textile industry (organised and decentralized sectors) in the Second Plan were announced in June 1956. On the assumption that, by 1960—61, the 400 million population of the country would need 18.5 yards of cloth per annum, to meet domestic requirements, has been laid down. Exports are envisaged at 1,000 million yards, thus bringing the total output repuired by the end of the Plan period to 8,400 million yards. A quantity of 6,700 million yards was taken as current production by the three branches of the industry viz., the mills, the powerloom units and the handloom industry, and on that basis production targets were assigned to each of them to make up the deficit of 1,700 million yards. It was further envisaged that about 18'000 automatic looms would be permitted to be installed in the mill sector to produce 350 million yards of cloth annually exclusively for export. So far as the mill sector of the industry was concerned, no specific assignment was made to increase its output for domestic consumption, the idea being that mill production should be stabilized around 5,000 million yards per annum, so that the additional demand for cloth might be catered for by the decentralized sectors.

Per Capita Consumption

The basic assumption for the planned production of cloth as detailed above is that per capita consumption of cloth in the country would rise to 18.5 yards by the end of the



Students take keen interest in research

Second Plan period. This question was recently considered by the Textile Enquiry Committee (1958) who have opined that, since the economic development is not at the rate envisaged in the Second Five Year Plan, the per capita consumption is not likely to exceed 17.5 yards. The per capita availability of cloth in 1955, 1956 and 1957 has been computed at 15.8, 16.5 and 16.8 yards, respectively, and, in the context of the economic conditions obtaining now, the Committee has indicated the unlikelihood of the per capita consumption reaching 18.5 yards as envisaged earlier.

Potentialities of Domestic Market

Apart from considerations of per capita consumption *vis-a-vis* the current production of cloth or the fixation of rated capacity of the different sectors engaged in the production of cotton cloth, the basic factor which needs greater emphasis is that India has within her borders a vast market for cloth capable of greater stimulation. Her economy is growing and, as the benefits of the developmental schemes undertaken or accomplished do percolate to the masses, an upsurge in the demand for necessities like cloth is bound to be felt. Periodical recessions in demand which seemingly show at times production as surplus are at best transitory phases emanating from the stresses and strains inevitable in the process of an under-developed economy gradually developing.

Since India became independent, considerable strides have been made by the cotton textile industry. Spindleage and to a lesser extent loomage have increased and although the partition of the country deprived Indian Mills of assured supplies of a good million bales of what had so long been home-grown cotton, production of cloth has been maintained and increased, and, today, India is the second largest producer of cotton textiles. Notwithstanding this fact, intensive working of the plant and machinery at the mills during the war years, coupled with the difficulties and prohibitive costs attendant on their replacement under conditions of belligerency and thereafter, have caused considerable wear and tear to the existing equipment. Consequently, the most urgent problem facing the industry now is rehabilitation and modernization of the machinery, not only from the standpoint of its continued growth but also from the angle of the industry catering effectively to the changing pattern of demand for cloth at home and abroad. Some items of textile machinery like ringframes, looms and carding engines are now being produced in adequate quantities in the country itself. A beginning has also been made towards the manufacture of automatic looms, draw frames, flyframes and reeling machines. Yet, for technical reasons connected with the quality of such machinery, the production of which has only recently been undertaken, or the indigenous unavailability of certain machinery the production of which is yet to be undertaken in the country, import of certain items of machinery mainly for improving the quality and finish of the cloth produced in India is, for the present, necessary.

India a Big Exporter

Another vitally important necessity is the maintenance and promotion of export of Indian cotton textiles to pay for the foreign cotton now being imported into India valued at Rs. 40 to 45 crores, to provide for the import of necessary textile machinery, spares, stores etc. and to ensure, under existing conditions, economic stability to the working of the mill industry in general.

India has been one of the biggest exporters of cotton textiles for a considerable number of years now. Exports of cotton textiles from India increased substantially during the years of the last war. By 1950, with an export of 1109 million yards India accounted for 17.3 per cent of the world trade in textiles. During the Korean War, an all-time peak was reached in our export of textiles at 1300 million yards. In recent years the exports have been as under:

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American women play a great part in American Cotton Mills

Mill-made Cloth

Year	Million yds.
1954	898
1955	815
1956	744
1957	828

Present Decline and Causes

Since the third quarter of 1957, there has been a notable decline in our exports and, during the first two quarters of 1958, the decline has been rather precipitous, as will be seen from the following figures:

1957 :	Third quarter		198.75 million yards
	Fourth ,,		171.22 ,, ,,
1958 :	First ,,	(Estimated)	165.00 ,, ,,
	Second ,,	,,	126.00 ,, ,,

The steep decline in the first and, particularly, in the second quarter of 1958 has been due mainly to a sudden drop in the offtake by

Asian countries, principally Burma, Indonesia, Malaya and Singapore. Increasing competition from Japan and China, the possibility of Singapore having to lose its entrepot textile trade with Indonesia, in view of the reparations treaty signed between Indonesia and Japan, political disturbances in some countries including, of late, the Middle East, have had serious repercussions in the external trade in Indian cotton textiles.

To maintain at least the level of our exports during 1954, sustained efforts are necessary to improve India's competitive position. The foreign markets have also to be studied more intensively from the point of view of changing demands. The international market is now a buyer's market. In the context of the aggressive competition prevailing in the international trade in textiles, quality and price are and will continue to be the determining factors with buyers. Japans's supremacy in the export trade in textiles is derived from her ability to compete in quality as well as in price. But even Japan is at present feeling the keen competition of China.

Features of Export Trade

The important features in our exports of cotton textiles are:

(a) About 90 to 92 per cent of our total exports consists of coarse and medium counts of cloth;

(b) An overwhelming percentage of our export of cloth is in the grey form which gets processed in the importing countries, for purposes of re-export;

(c) A bulk of our exports are to countries in Asia and Africa;

(d) Comparatively very little percentage of our exports are in dyed or printed and in other processed forms.

Export a Necessity

Besides keeping up and developing the traditional markets for our textiles, intensive efforts have to be made to explore possibtlities of greater sales in markets to which uptil now our exports have not been on any considerable scale. Markets in Central Europe like West Germany, etc., may take up considerable quantities of our textiles provided cloth is supplied according to the specifications required in those markets; a greater degree of organisational skill and salesmanship will also be necessary. Diversification of the range of fabrics produced and greater reliance on production and export of more processed cloth may open out fruitful avenues for increased sales. By virtue of her geographical location and certain other factors like availability of local cotton India is in a position to supply in greater measure the textile requirements of other countries.

Industry's Responsibility

The Government of India have been earnest in promoting exports of textiles produced in this country and have already taken certain steps. Some of the important steps taken are:

(1) Constitution of the Cotton Textiles Export Promotion Council for intensive study of market conditions abroad for cotton textiles and to promote exports;

(2) grant of rebate of excise duty on goods exported;

(3) assistance to manufacturers and exporters in obtaining raw meterial required for producing goods meant for export in good time and at fair prices;

(4) popularising of commercial arbitration for settlement of trade disputes;

(5) introduction of quality control measures and inspection schemes in regard to textiles intended for export and

(6) participation in international exhibitions and maintenance of trade centres and commercial show-rooms at important centres in the world.

Some further measures which are considered necessary to enable manufacturers to improve the quality of the fabrics produced are also being actively considered.

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Sindri is thus helping the farmer, the backbone of the country, to retrieve his stature and gain new strength, thereby putting India's economy on a solid foundation.
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DYESTUFFS RESEARCH AND APPLICATION

W. JENNY, Ph. D.,

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"Mineral coal, with the aid of fire and chemical agents, yields three substances which are particularly noteworthy for the very attractive colours they produce." F. F. Runge, in his "Farbenchemie", thus summarized all that was known on the artificial production of new dyes a few years prior to the discovery of mauve. Like Liebig, he was convinced that "many similar finds would be made if experiments were multiplied", but neither chemist is likely to have suspected how soon his forecast would come true.

In 1856, textile printing and dyeing relied on mineral and vegetable dyes almost exclusively. The only synthetic dyes to be used were picric acid introduced into silk dyeing in 1849, and murexide as a mordant on cotton. Fast dyeings were only to be had with indigo, the one available vat dye, and with madder and Persian berries. Natural dyes were applied by complicated processes. Turkey Red required nineteen operations extending over six to eight weeks. Metal mordants played an indispensable part.

In the great search for synthetic dyes, which at once set in with the discovery of mauve, the large class of Basic dyestuffs was built up. The first groping investigations were transformed into systematic effort by Kekule's "vision" of the way the quadrivalent carbon atoms are linked and the benzene ring is arranged. The coal-tar colour industry yields perhaps the most striking example of a chemical theory translated into practical success.

The chief field of application of the basic dyes was silk. Pretreatment of cotton with tannin and tartar emetic (a method discovered, in 1870, by Dale and T. Brooke) and the sulphonation of Basic dyes extended the usefulness of the latter to cotton, linen, and wool. The Basic and Acid dyes simplified procedure

enormously as compared with the laborious mordanting methods. The trend in the application of dyestuffs is from complexity to simplicity, as in the history of applied natural science generally. Next to this, a principal aim of dyestuff research chemists is to obtain products of greater fastness.

Discovery of the aromatic Diazo compounds by Peter Griess (1858—60) was soon followed by the first basic Azo dyes, for which credit must go chiefly to Martius, Witt, and Caro. Development of the Azo group of dyes proper began with the finding of the acid Azo colours by Roussin in 1873 and of Congo Red, the first substantive Azo dye, by Bottiger in 1884. In a very short space of time, dyes of every possible shade were produced, O. N. Witt's theory (1876) that dyes are made up of chromophoric and auxochromic groups proving especially fruitful. Their cheapness explains why the Direct dyes, in spite of lesser fastness to light and washing, have lost little of their importance. Another reason are the successful efforts of dye manufacturers to improve the fastness properties. A. Werner's coordination theory (1893) promoted the continued development and improvement of the Azo dyes. The most important single step forward was without doubt the discovery that the grouping of salicylic acid (Nietzki, 1887) and the o,o'-dihydroxyazo group enable dyes to form stable metal complexes.

"Afterchroming" was a further move towards simplicity of application. However, work on the metal complexes was pursued with such vigour not solely because simpler and more dependable methods of application were sought. Many shades, when aftertreated with metal salts, had long been known to show improved fastness to washing and light. As a result, a large number of direct Azo dyes were created which are a match for some of the best vat dyes in point of light fastness (Chlorantine Fast and Neocupran dyes by CIBA).

Application was still further simplified by the Metachrome and Synchromate methods of chroming in the dyebath. The final step, incorporation of the chromium atom in the dyestuff molecule, was successfully accomplished by CIBA about the year 1920 with the Neolan range of wool dyes, soon after followed by the somewhat similar Palatine Fast dyes of BASF. Complex formation having been taken care of by the manufacturer, dyers were now saved the trouble of premordanting and of aftertreatments with metal salts. Most Neolan and Palatine Fast dyes contain one metal atom per molecule of Azo dye and thus require an adequate amount of strong acid in the dyebath. In recent years, the Cibalan and Irgalan dyes introduced by CIBA and Geigy respectively have provided Azo colours which can be applied to wool from a neutral or weakly acid solution to produce bright and very fast shades. These dyes contain two Azo dye molecules for every metal atom, and the sulpho groups are replaced by alkylsulphonyl, sulphonamide, and similar solubilizing groups.

Another group of Azo dyes with a revolutionizing effect on application technique were the Naphtol AS dyes of Zitscher and Laska (1911), which are produced on the fibre direct. Further work on these led to the Rapid Fast, Rapidogen, and Neocoton dyes, a substantial extension of the resources of dyestuff manufacturing.

The elucidation of the constitutional formulas of the two fast-dyeing natural products, indigo and alizarine, together with their synthesis formed the starting point for the phenomenal development of the indigoid and anthraquinonoid Vat dyes. When Graebe and Liebermann, in 1868, determined the structural formula of alizarine and synthesized the dye, this was the first vegetable dye, indeed the first fast dye in history, to be produced synthetically. Although alizarine yields one of the most attractive and fast-to-light reds available (Turkey Red), it has fallen into almost complete disuse mainly as being cumbersome to apply while dyeings were not readily discharged. A. von Baeyer's first synthesis (1880) of indigo was followed by intensive investigation

of the indigoids. The greatest achievements in this line of development were the synthesis of Thioindigo Red by Friedlander in 1905, the technical preparation of higher brominated indigoids, and the production of numerous mixed indigoids by G. Engi (CIBA) in 1907. It should not be overlooked in this connection that the spectacular rise of the Vat dyes would not have been possible without the discovery of sodium formaldehyde sulphoxylate, which for the first time afforded a simple method of applying these dyestuffs.

The first synthetic members of the anthraquinone series were mordant dyes. R.E. Schmidt and R. Bohn, in 1888, treated fuming sulphuric acid in the presence of catalysts, hydroxyl groups being introduced in the prooess. This resulted in a reaction which served as the key to a multiplicity of new syntheses. The year 1901 saw doubtless the greatest achievement of all in anthraquinone chemistry from the point of view of industrial promise, i.e., R. Bohn's (BASF) synthesis of indanthrone. The introduction of this dye, which is considerably faster even than indigo, initiated the formidable expansion of the vat dye field; more still, it marks the inception of the modern insistence on colour fastness.

The first fast vat dyes, indigo and indanthrene, yielded blue shades only, but it was not long before a rich gamut of colours became available with the invention of the acylaminoanthraquinones (Deinet, 1909), the anthraquinone-acridones (Ullmann, 1908—9), Caledon Jade Green (Scottish Dyes Ltd., 1919), and the diphthaloylcarbazoles (Uhlenhut, 1910), to instance a few of the more important types. Industry is spending vast sums on continued research into vat dyes, the object being colours that are cheaper, faster in use, and more economical to apply.

The desire to obtain ease and speed of application, in so far as vat dyes were concerned, led to the invention of the indigosols (M. Bader, 1921), which have found their way into all branches of dyeing and more particularly into calico printing.

We close this brief review with a reference to the Sulphur dyes on which interest concentrated between 1893 and 1902, in particular. A few very fast blue and black brands are popular for all manner of mass produced styles on account of their simple dyeing method and low cost. Other important developments such as the oxidation colours (Aniline Black), the phthalogenes, or the nitroso, stilbene, pyrazolone, and quinoline colours have to be passed over.

As an outcome of this rapid expansion in dyestuffs manufacture, spectacular advances were also made in the chemistry of textile auxiliaries and finishing agents. A hundred years ago, soap and sulphonated olive oil were the chief auxiliaries used. By sulphonating castor oil (1875), Crum obtained Turkey Red Oil which achieved outstanding importance in Naphtol AS and Turkey Red dyeing. The shortage of fats and oils during the first world war gave the original impetus to textile chemical research organized on a broad front. This has led to the growth, side by side with dyestuffs manufacturing, of a large-scale textile chemical industry, and the onetime substitutes have been transformed into indispensable products in their own right.

Detergents, and wetting and levelling agents occupy first place among textile auxiliaries proper. "Syndets" have been placed on the market which are without the disadvantages of soap, such as sensitivity to hard water and acids. Petroleum chemistry is making an outstanding contribution to the range of such textile processing assistants. Chemicals from petroleum are revolutionizing all industrial chemical operations and in some sectors are causing a wholesale change in the raw materials basis. The work of Hartmann and Kagi (CIBA) on acid soaps, published in 1928, and the Sapamine patents pioneered the new era in the field of synthetic auxiliaries. Advances in textile finishing occured similarly in leaps and bounds. Probably the first product capable of improving the water and wash fastness of Direct dyeings was CIBA's Sapamine KW,

which is cation active. A great deal of very successful work has been accomplished in the very complex field of textile softening and delustring agents, permanent finishes based on synthetic resins, and optical brighteners. In a special class are the protective agents—colourless, but substantive and fast-to-light compounds.

As might be expected, continuous improvement of dyeing machines was a corollary of the steady development of dyestuffs chemistry and methods of application. At one time, dyeing had been carried out in simple vessels with winches worked by hand, and over open fires. Mechanization set in with the generalized use of synthetic dyes, and in its present advanced form is entirely due to the sustained and creative co-operation of the leading machine builders with progressive dyers and dye manufacturers. Research in the dyestuffs industry was mainly designed to yield faster and cheaper dyes applicable by simpler and more dependable methods. To-day, the accent is on longer runs and the speeding up of production. Continuous dyeing methods as mainly developed in the United States and Great Britain, e. g. the Du Pont Pad Steam, the Hot Oil (Standard Williams Unit), and the Standfast Molten Metal processes, achieve running speeds of up to 100 yards per minute and more, the colour yield being practically equal to that of conventional methods. In the U.S.A., yardages of several millions are vat dyed to one shade, by continuous method. Compared with the complications of one-time Turkey Red dyeing, this is no less than revolutionary. The investigations of vat acids (by I.G.) and the preparation of pigment dispersions of extremely fine particle size have played an important part in making the continuous methods a reality.

A host of chemists throughout the world are concerned with the improvement and extension of dyestuff ranges for natural fibres—cotton, wool, and silk—but just as many scientists are keeping up the feverish search for new dyes and dyeing methods applicable to the man-made fibres. Following the invention of "artificial silk" by Chardonnet in 1885, a powerful industry has grown up producing a wide range of regenerated and fully synthetic fibres, some of which possess outstanding all-round fastness properties, e.g., resistance to chemical attack. Many of the new fibres, however, have poor affinity for conventional dyes. Clavel, in 1921--2, suggested the use of water-insoluble disperse dyes for acetate rayon, and these have also proved applicable to "Orlon"[1], "Terylene"[2], "Dacron"[1], and triacetate fibre. The Cibalan and Irgalan dyes, which have been mentioned, are specially suited for dyeing nylon. The Basic dyes have seen a revival in the form of the "Deorlene" colours of CIBA for dyeing polyacrylonitrile fibre. Methods for dyeing synthetic fibres are in continuous development. Hank dyeing is avoided as uneconomical and replaced by package dyeing of cakes and rewound cakes. When dyeing by this method, the stability and the fineness of the dyestuff dispersions used have to be of a very high order. Dyeing in the dope is assuming increasing importance but limits the number of pigment dyes that can be used. In this connection, the exceptional stability of copper phthalocyanine, first prepared by H. de Diesbach in 1927 and assessed at its true value by Linstead who determined the molecular structure, deserves special mention. The Thermosol process, high temperature pressure dyeing, and the use of swelling agents and carriers have broken new ground in the dyeing of hydrophobic fibres. Each new fibre confronts the dyestuff chemist with an array of fresh problems only to be solved with the aid of the latest techniques of chemistry and as a result of closest collaboration of fibre manufacturers, textile chemists, and colourists. What comes to mind are special fastness properties required by novel-type dyes for man-made fibres, i.e., fastness to solvents, gas fading, and sublimation. Here, as in many other special fields of dyestuffs chemistry, Vat and Azo dyes, for instance, unsolved problems clamour for intensified fundamental research.

As is well known, there was a time when the most famous professors of chemistry devoted themselves to the investigation of dyestuff problems, but a marked change has occured over the past thirty years. Research at the universities has increasingly been monopolized by interest in biochemistry and drug synthesis. By now, this shift in interest is virtually complete: only two university chairs of dyestuffs chemistry can be recorded in western countries (Leeds, England, and Basle, Switzerland). While the pervasive influence of general theoretical chemistry on dyestuffs chemistry should not be misjudged, the scant attention given at the universities to fundamental research in dyestuffs will inevitably come to be felt as a serious deficiency. It explains why the solution of problems of pure research is a matter of mounting concern to industrial laboratories. A wholesale reversal has also taken place in application research, which, up to the first world war, was the province of the dye users, i.e. dyers and printers, while, since 1918, it has virtually been taken over by the dyestuffs manufacturers or carried on under their guidance.

Perhaps the greatest difference between the chemistry of to-day and a century ago is seen in our greater understanding of molecular structure. In mid-nineteenth century, there still was a doubt as to whether the formula for water should be HO or H_2O. Since then, new insights into structure and atomic linkage as well as the discovery of numerous unknown reactions have immeasurably increased the scope of chemical synthesis. Modern dyestuffs research proceeds with the latest tools such as chromatography, and X-ray and infra-red spectroscopy.

Physical and physico-chemical methods are being adopted in increasing numbers. Dyeings and dye solutions are measured with automatic recording spectrophotometers and their hues determined objectively. Identification of various crystalline modifications assumes particular significance in the case of vat and pigment dyes. Many dyestuffs, e.g., copper phthalocyanine, occur in polymorphous forms which often differ greatly in dyeing behaviour. Study of such modifications by means of X-ray diffraction has become standard procedure in dyestuffs laboratories. Among spectrophotometric methods no doubt the most important is that using infra-red rays which yields information on molecular structure, isomerism, etc. Infrared spectrum analysis is applied to the quantitative determination of various components in intermediates.

The latest advances, especially in theoretical physics, which are shedding light on the relation of structure and colour, certainly will influence the future line of research in dyestuff laboratories. Qualitative treatment of the problem as initiated by O.N. Witt's colour theory may be said to have brought its solution within reach, thanks to the concept of mesomerism (desmotropism) and to the methods of approximation introduced with quantum theory. Quantitative treatment of the optical properties of dye molecules, such as by H. Kuhn's electron gas method, is pointing to new horizons in synthetic dyestuffs chemistry.

The success that has attended work in the field of synthetic dyes over the past one hundred years is the reward for patient and persistent research. No less is it due to a scientific attitude of mind controlling thought and action. It is to be hoped that dyestuffs chemistry will continue to help to raise living standards and contribute its quota of creative achievements in pure research, and the technological inventions, to chemical science as a whole.

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HANDLOOM INDUSTRY

N. K. VINAYAKAM

All-India Handloom Board

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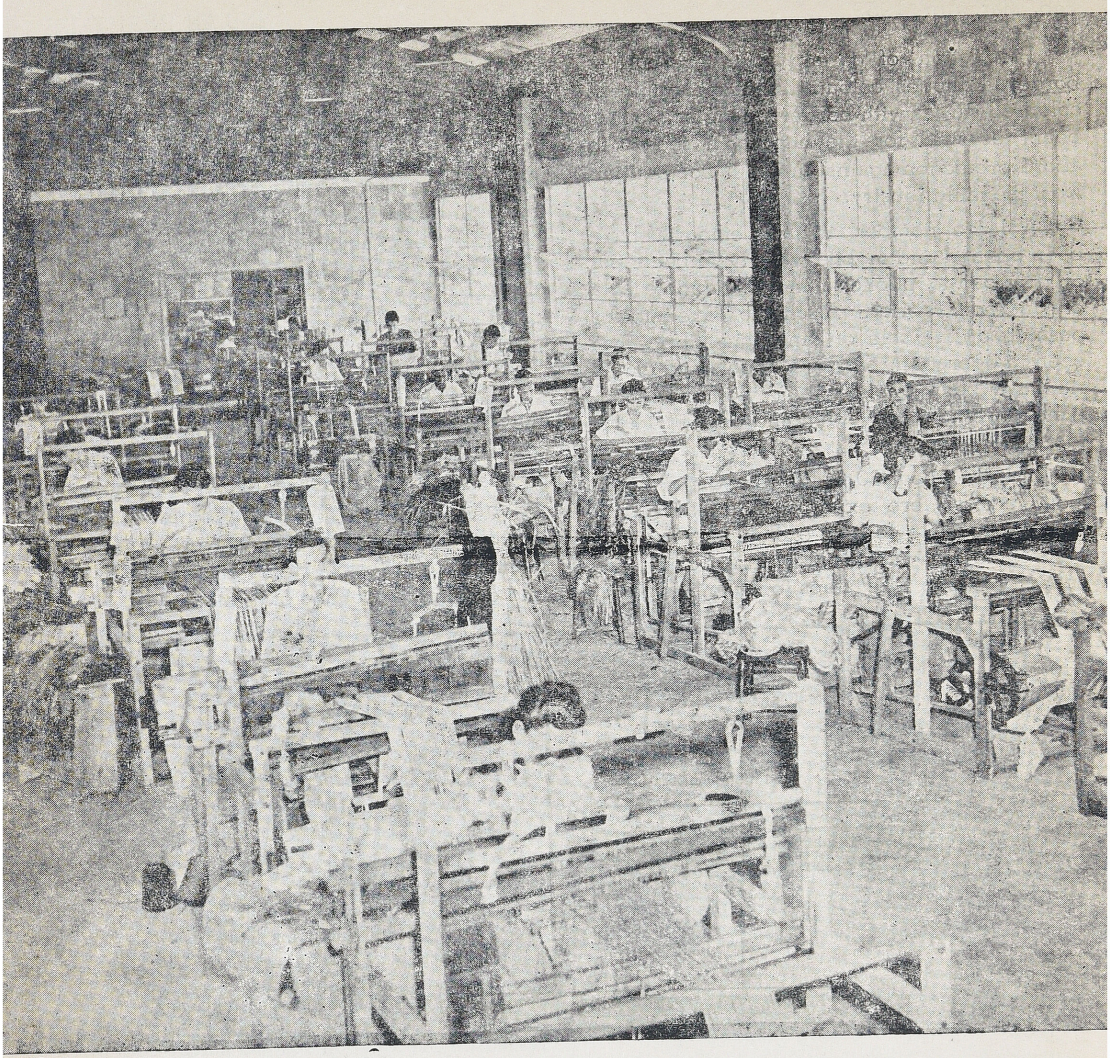
The imposition of an alien rule, not very sympathetic to the development of the superior types of weaving, together with the competition from the mill sector, to some extent retarded the growth of this industry. However, the genius of the handloom weaver was hard to kill, and decade after decade the industry put forth its best efforts to rise up to its preeminence and glory of the bygone days.

A crisis developed in the year 1952 when the demand for the handloom fabrics fell resulting in heavy accumulation of stocks putting the handloom weavers out of work. The sad plight of the handloom weaver was responsible for the Government of India taking quick decisions in the matter. A fund was created by levying a cess on mill production for financing development schemes of this handloom industry.

Policies Evolved

The Handloom Board was constituted in December, 1952, with experienced leaders of the handloom industry as members. Policies were evolved and principles were formulated to help the handloom weaver to promote co-operative efforts to better their lot. Assistance for share capital, working capital, grants for improved appliances, additional marketing facilities, common facilities for dyeing, designing and pattern making etc. were given in a great measure.

A sum of Rs. 20 crore has so far been canalized through State Governments for the development of the industry with its 2.9 million looms of which more than a million is in the co-operative sector. The production of handloom fabrics has risen from 1,100 million yards in 1952 to 1509 million yards in 1956.



The handloom industry provides employment to several million people.

In the capitals of several States and in important centres of handloom industry, competitions were held among handloom weavers and prizes awarded for the best handloom products and designs.

Door to door sales on nicely decorated bullock carts were also organised in rural areas of Bihar State. The different media of publicity were utilised to popularise handloom products throughout the country.

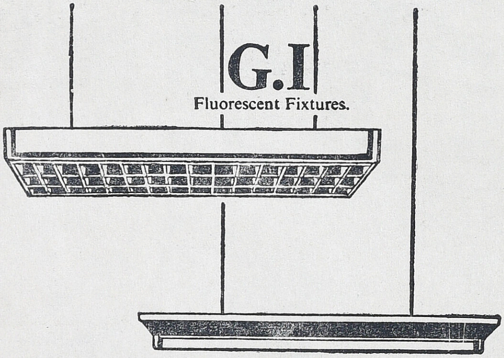
Production of certain varieties such as bordered dhoties, coloured bedsheets, towels, coloured sarees with borders, lungies etc. has been reserved for the handloom sector to afford protection against unequal competition from the mill industry.

A large number of sales emporia have been opened and mobile vans have been put on the road to publicise and to promote sale of handloom fabrics. A scheme of rebate for pushing up the sale of handloom fabrics has been in operation. Foreign depots and emporia have been opened in Ceylon, Rangoon, Bangkok, Singapore, Aden and Kuala Lumpur to promote exports.

In 1956 about 60 million yards of handloom facrics were exported and earned 87 million rupees in foreign exchange. The All-India Handloom Fabrics Marketing Society has been formed to take steps to augment handloom export and to promote inter-State marketing.

This is just a bird's eye view of the steps taken to put the handloom industry once again on its feet. As it is, things are looking up for the handloom weaver. There is a growing consicousness among the classes that the handlooms offer a wonderful range to select materials from, whether for style wear or ordinary wear, whether for furnishing or for decoration.

There is an increasing awareness among the people that handloom creations are artistic and distinctive. The present beckons to the past and we see today old patterns going in with latest styles and in new sartorial settings. The handloom weaver is slowly coming into his own. He needs the continued and growing patronage of us all.



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RAYON INDUSTRY

The rayon weaving industry is at present largely dependent on imported raw material. Resources for the manufacture of cellulose pulp and the chemicals required by the rayon industry are available in the country, but they have yet to be exploited fully and standardised with regard to quality. The Second Five Year Plan envisages that one or two units for the manufacture of chemical pulp will be set up under the National Industrial Development Corporation with the target of production at 67.2 million lbs.

Indigenous production of rayon has so far been inadequate in quantity to meet the total and varied requirements of the industry. The present requirement of artsilk/synthetic yarn is estimated at about 75 million lbs. per annum, while the indigenous production during 1957 was of the order of 25 million lbs. There are now four rayon factories in India, of which three have adopted the viscose process while the fourth is manufacturing acetate rayon yarn. In addition to the rayon filament industry, a plant has been established at Nagda for the manufacture of viscose staple fibre.

Productive Capacity

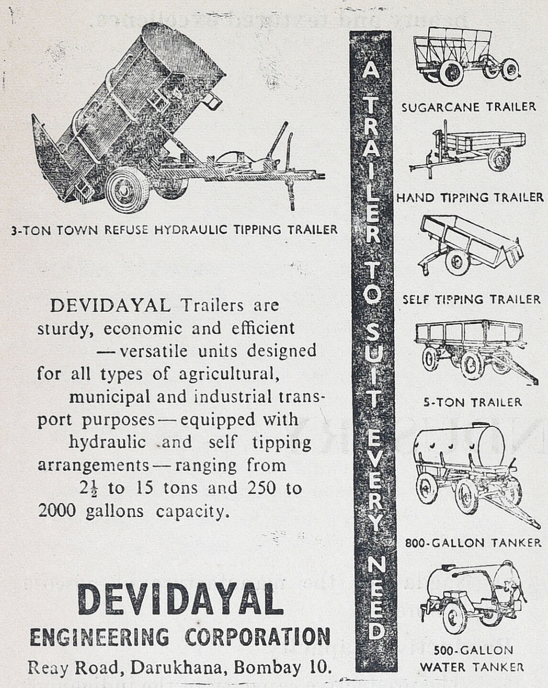
The productive capacity of the indigenous rayon weaving industry is estimated at 540 million yards per annum. In practice, however, the production of rayon fabrics is much less, chiefly due to inadequate supplies of rayon yarn. The estimated domestic availability of art silk and mixed fabrics during the last three years has been as under :

(In million yds.)

Year		Indigenous production	Imports	Exports	Quantity available for domestic consumption
		(in million yds.)			
1955	...	243.14	8.754	2.922	248.972
1956	...	295.75	7.467	3.175	300.040
1957	...	270.75	2.546	2.367	270.929

Exports

India is now exporting to some extent rayon textiles chiefly to markets in Asia and



Africa. As against an export target of 10 million yards under the Second Five Year Plan, the quantum of exports as given above constitutes less than 1/3 of the target. India's competitive capacity in selling her rayon fabrics in overseas market is reduced because of her dependence on imported rayon yarn. Even the prices of indigenous rayon yarn are higher than those quoted by foreign manufacturers, chiefly due to India having to import raw material for the manufacture of rayon yarn.

The Government of India have set up an Export Promotion Council with a view to develop export of silk and rayon fabrics. This Council has been doing propaganda and publicity to stimulate foreign demand for Indian rayon fabrics and conducting market studies with regard to the dress habits and tastes of foreign consumers.

Incentives for Export

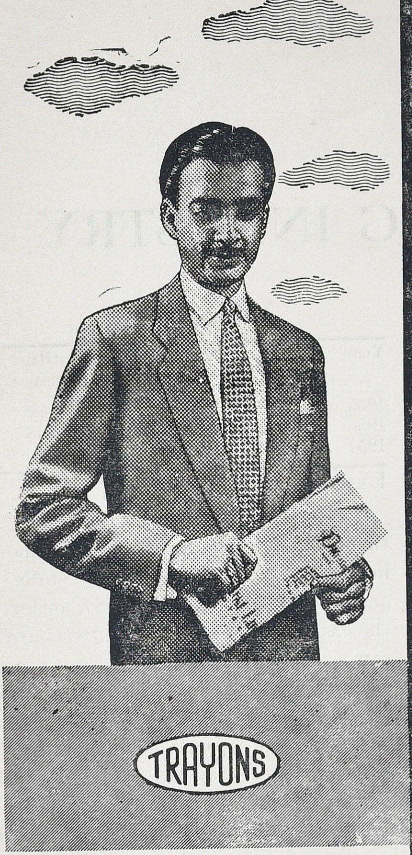
In order to promote the exports of art silk fabrics, the Government of India has taken the following measures :—

(1) The exporters of art silk fabrics are granted licences for the import of art silk yarn to the extent of 100 per cent of the f.o.b. value of exports in case of fabrics other than sarees and in case of sarees to the extent of 66.2/3 percent of the f.o.b. value of exports. The licence-holders can, if they so desire, import art silk fabrics and spare parts for the machinery required to produce art silk cloth to the extent of 15 per cent and 10 per cent respectively of the face value of the licences issued.

(2) The prospective licences for the import of art silk yarn are issued to the manufacturers of art silk cloth against anticipated exports of art silk fabrics.

(3) Drawback of import duty on art silk yarn contained in exported fabrics is granted.

A healthy expansion of the export trade in rayon fabrics is very necessary for the continued growth of the industry itself. Standardisation of the products, technical and market research, rationalization in production and adoption of more modern and upto-date techniques of production are matters which require more earnest and closer attention.



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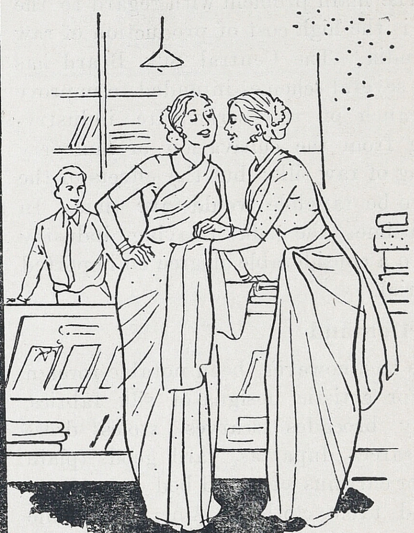

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SILK WEAVING INDUSTRY

The Indian silk weaving industry, which is largely confined to handlooms, produces a wide range of artistic and delicately woven fabrics. The cheapness in prices of fabrics made of art silk/synthetic fibres has affected the consumption of raw silk in India in recent years. The main problem with regard to the industry is the high cost of production of raw silk in India. The Central Silk Board has launched several schemes intended to improve every branch of the sericulture industry, beginning from the cultivation of mulberry to weaving of raw silk ; but the effects of the schemes to be tangible would take time. In the meantime, the silk weaving industry depends to a considerable degree on imported raw material.

Foreign Demand

There has, however, been notable foreign demand for artistic designs of silk fabrics, particulary brocades, scarves, stoles, dress material, sarees, dupattas, yard goods (plain fabrics) for curtains etc. and bed spreads or covers and table cloth in America, Middle East Countries, U. K., Ceylon, Malaya, Hong Kong etc. The following table shows the exports of silk fabrics from India during the last three years :—

Year	Quantity (yards)	Value
1955	198,300	23,90,605
1956	219,348	25,80,486
1957	230,650	17,95,325

Export Incentives

All imports of raw silk are canalised through the agency of the Government and no licence is issued either to the trade or to the actual users for import. In order to assist the exporters of silk fabrics to secure imported raw silk at reasonable rates against their exports of silk fabrics and to promote exports of such fabrics, the Government of India have drawn up a scheme, effective from January 1, 1958, according to which raw silk will be made available to the extent of 66.2/3 per cent of the f.o.b. of the pure unmixed fabrics exported. Raw silk will be made available to the exporters at c.i.f. prices plus import duty and incidental charges. Exports of tussar silk fabrics of Indian origin and silk waste of all origins, except Mysore, are allowed in export to all permissible destinations without any restrictions. In regard to export of tussar silk fabrics to U.S.A., a scheme of certification of the fabrics as of Indian origin has also been devised and is being implemented.

Wool - a pleasant companion when winter unfurls its blasts and chills - has a great future before it.

WOOLLEN INDUSTRY

The major expansion in the woollen industry took place between 1919-20 and 1950—57. According to the Report of the Panel of the Woollen Industry published in May 1946, the capacity of the industry was as under :—

Woollen spindles	50,000
Worsted spindles	37,500
Powerlooms	2,300

The capacity since then has expanded considerably and the present position is as under :—

Woollen spindles	60,979
Worsted spindles	1,17,359
Powerlooms	4,042

Production of Yarn and Fabrics

The target of production for the Second Plan period is as under :

Woollen yarn	12 million lbs.
Worsted yarn	15 million lbs.
Woollen worsted fabrics ...	15 million yds.

The production during the last three years has been as under :

	1955	1956	1957
Woollen yarn (million lbs.)	10.28	11.62	13.10
Worsted yarn (million lbs.)	10.41	13.97	14.72
Woollen/worsted fabrics (million lbs.)	13.96	16.34	18.40

There is however, greater need for expansion in the combing sector to produce wool tops, the requirements of which has been continuously on the increase from 5.6 million lbs. in 1951-52 to 15.11 million lbs. in 1957-58.

Exports

The biggest item of export is oriental and floral designed carpets and rugs manufactured by the handloom sector. These carpets are manufactured in Mirzapur, Bhadoi, Banaras, Agra in U.P. and Srinagar in Kashmir. The export of the same during the last three years was as under :—

Year			Quantity	Value
			(million lbs.)	(million Rs.)
1954-55	...	...	9.64	38.96
1955-56	...	...	9.66	39.70
1956-57	...	...	7.24	41.00

Development Council

The development Council for the wollen industry was formed during 1955 and has been assigned, *interalia*, the following functions :—

(i) Recommending targets of production.

(ii) Recommending measures for securing the fuller utilisation of the installed capacity.

(iii) Promoting arrangements for better marketing and helping in the devising of a system of distribution and sale of the produce of the industry which would be satisfactory to the consumer.

(iv) Promoting standardisation of production.

The Council has also been entrusted with the work pertaining to export promotion of woollen manufactures. There is also an incentive scheme propounded whereby the exporters of woollen manufactures can obtain imports of essential raw materials. The Export Promotion Committee of the Development Council has also drawn up a programme of work for publicity and propaganda, etc., for woollen manufacturers so as to enable this industry to increase its products.

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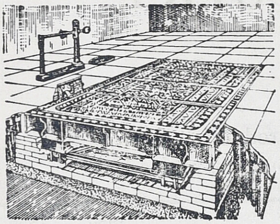

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COIR INDUSTRY

Production of coir fibre is estimated at 130,000 tons a year in the whole of India. Almost the entire fibre produced is utilised for being spun into yarn. Export of fibre outside India is negligible, i.e. only about, 600 tons a year on an average. Total production of yarn is estimated at 120,000 tons a year.

Manufacture of Floor Coverings

The manufacture of coir floor coverings such as mats, mattings, rugs, carpets and mourzouks is an important industry which has developed in certain areas of the Kerala State. The products of this industry amount to about 21,000 tons per annum, valued approximately at Rs. 4 crores. These are known to the trade as door mats with pile woven coir matting in rolls, rugs, and mourzouks in various sizes, qualities and patterns. Door mats with pile are either coir mats or fibre mats. The qualities vary according to requirements. Mats with attractive designs, either stencilled or inlaid, are also manufactured and exported, besides mats.

Coir mattings cover a wide range of qualities and attractive colours and designs, to suit the taste of the consuming markets. They are one of the best materials known throughout the world for their durability, sound- proofing and damp-resisting qualities, and largely used in long corridors in offices and factories. Coir rugs are fabricated either from plain matting cut into suitable lengths and designs stencilled thereon or they are fabricated from coir mattings with coloured woven designs. The rugs produced with attractive designs in large quantities find extensive sales in the overseas markets. Pleasing pastel shades make these rugs very attractive as floor coverings. Most housewives in foreign countries, particularly in the United Kingdom and on the Continent, have special preference for coir mattings and rugs, because of their wearing and damp-resisting qualities, besides their comparative cheapness.

Exports of Mats and Mattings

Of the annual production of coir products amounting to 21,000 tons, internal consumption is only less than 1,000 tons. The coir industry is, thus, to a great extent, dependent upon the demand for coir yarn and coir

products from foreign markets. Such demand has been more or less static for the last many years. When there is increased demand, it would not be difficult to step up the production of coir products, as even now the installed capacity is not being fully utilised.

The value of coir mats and mattings exported has been more or less static between Rs. 215 lakhs and Rs. 250 lakhs between 1951 and 1957. In the latter year, for instance, the quantity exported amounted to 282, 000 cwts. valued at Rs. 217 lakhs. The United Kingdom has continued to be our main market for coir manufacturers. Next in importance come the U.S.A. and Australia. The other important countries which import Indian coir manufactures are: Sweden, Czechoslovakia, Canada, Kenya, Venezuela, Saudi Arabia and Iraq.

Export of Yarn

On an average, about 48,000 tons of coir yarn are exported. The countries which import coir yarn are mainly the United Kingdom, all West European countries, the U.S.A., Canada, Australia, Japan and Burma. Netherlands generally tops the list. Japan imports coir yarns entirely for the manufacture of fishing nets. Countries on the West Coast of America use it for agricultural purposes. Those on the East Coast use about 30 per cent of the yarn imported for the manufacture of floor coverings, and the balance for other purposes. On the other hand, fairly large quantities of coir yarn imported into the United Kingdom and almost the entire quantity imported into Holland, Germany, Italy and other Continental countries of Europe, are utilised in the manufacture of floor coverings. In 1957, about 11 lakhs cwts. of coir yarn valued at Rs. 557 lakhs was exported. Of this quantity, Holland took 179,000 cwts. valued at Rs. 103 lakhs, and the United Kingdom 134,000 cwts. valued at Rs. 66 lakhs. The offtake, in quantity, of the more important importing countries were: West Germany: 195,000 cwts; Italy: 98,000 cwts; France: 80,000 cwts; Portugal: 36,000; Japan: 70,000; and the U.S.A. 86,000 cwts.

Total Exports

The total quantity and value of coir products exported in 1957 amounted to 15, 00, 000 cwts and Rs. 868 lakhs, respectively, the details being as under:

Varieties	Quantity (000 cwts.)	Value (Rs. lakhs)
1. Fibre	16	8
2. Yarn	10.85	5,57
3. Cordage and rope ...	45	23
4. Mats and mattings ...	2,82	2.17
5. Floor coverings ...	77	63
Total ...	15,05	8,68

Measures to Stimulate Exports

In order to ensure the proper development of coir industry and the export of its products, a Coir Board was constituted in 1953. The Board has taken part in a number of Indian and foreign exhibitions. As a result of this, it has been receiving a number of inquiries from both internal and foreign dealers. The Board has organised publicity, both internally and externally. The Government of India have sanctioned a scheme of the Board for the establishment of a Coir Research Institute at a total cost of Rs. 20 lakhs during the Second Plan period. The rules relating to registration and licensing of exopoters of coir and coir products have been finalised. In view of the importance of the the coir industry as a foreign exchange earner, the Government of India have now enhanced the overall allocation for development of the industry in the Second Plan from Rs. 10, lakhs to Rs. 170 lakhs. The allocation for State schemes has been increased from Rs. 70 lakhs to Rs 140 lakhs.

Employing nearly a million people British textile Industry still forms one of the staple industries.

BRITISH TEXTILES

DUNCAN CROW

London

Wool

The two branches of the wool industry are woollen and worsted, the latter taking its name from a small village near Norwich in East Anglia, which was once the centre of the trade. From East Anglia the industry moved north at the beginning of the Industrial Revolution, and is now mainly concentrated in the West Riding of Yorkshire, where two-thirds of woollens and over 90 per cent of worsted are produced, in cities and towns such as Leeds, Bradford and Huddersfield. Notable among other areas where the wool industry is carried on are the West of England and various regions in Scotland, of which the most important is the Border country.

About one-tenth of the raw wool used by the industry is home-produced: the rest is imported, mainly from Australia, New Zealand, South Africa and the Argentine, making the United Kingdom by far the largest buyer of wool in the world.

Exports of wool products include not only finished goods, blankets, and carpets, but also yarns and tops. One of the main markets for tops is Canada, which also the biggest single market for all British wool exports. Close behind Canada is the United States; between them these two countries take about one quarter of British wool exports. Other important markets are Europe and the Commonwealth countries in the sterling area.

Cotton

Cotton is an even more localized industry than wool, being almost entirely confined to

Lancashire. Within the country there is further localization; for instance, towns such as Oldham and Bolton concentrate on spinning, and Burnley and Blackburn on weaving.

Unlike the wool industry, the cotton industry depended entirely on imports for its basic raw material until the inter-war years, since when rayon and other man-made fibres (e.g., nylon, 'Terylene' [Dacron] and 'Fibrolane') have played an increasing part in the industry. By the use of these fibres, either alone or blended with cotton, designers and manufacturers are able to create a variety of fabrics for different purposes.

The main markets for cotton goods are Australia, the Union of South Africa, British West Africa and Ghana.

Linen and Jute

Both linen and jute are localized industries; indeed the latter is practically concentrated in the one city of Dundee, although there are a few jute concerns in other Scottish towns and in various English ports. Dundee is also a linen centre, as are Brechin, Forfar and Dunfermline is Eastern Scotland, but the largest linen manufacturing area in the world is Northern Ireland; Irish linen is world famous for its high quality.

The raw material of the linen industry is flax, and this is spun and woven into a number of products such as drill and canvas, while the additional process of bleaching produces lawn and damask for household linen and handkerchiefs. Linen is often blended with other fibres, as for example with cotton, to produce strong 'union' cloths, and there is a large and growing use of rayon. Most of the flax is imported, the chief source of supply being Belgium. On the export side, the main production centre is Northern Ireland, and the United States is by far the most important market.

Jute, originally introduced as an alternative material to flax when supplies of that fibre were uncertain, has long since claimed its own place as the world's principal packaging material. It has, of course, many other uses; in the United Kingdom more than half of the Jute processed is for packing carpets and linoleum, for ropemaking, for tarpaulins and for roofing fabrics. The chief source of raw jute is Pakistan; India supplies jute cloth for the making of bags.

Silk and Lace

To those naturally produced textiles already described may be added silk and lace; their contribution to the United Kingdom's export trade is on an altogether smaller scale than that of cotton and wool, for example, but is nevertheless important. Indeed, the British industry is the world's largest exporter of lace.

Synthetic Fibres

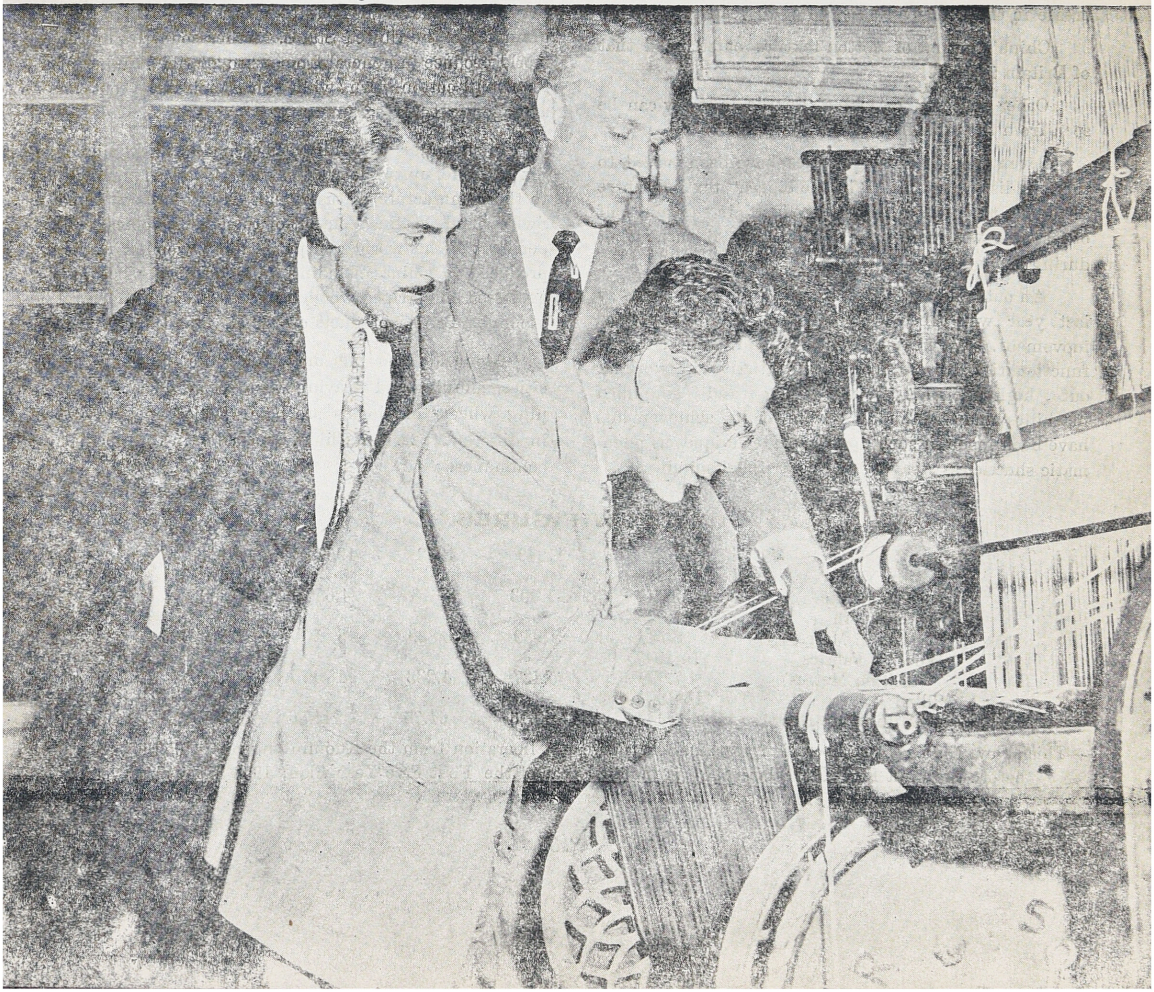
The production of rayon is a comparatively old-established industry dating from the beginning of the century; the other man-made fibre are of much more recent origin. The best known of these at the moment is nylon, which, unlike rayon, is produced entirely from minerals, all of which are found in Britain. Nylon was first manufactured in the United States in 1939, and in the following year production began in this country, Imperial Chemical Industries Ltd. (ICI) having bought the Commonwealth rights, excluding Canada, from the American Dupont company. Since then the circle has been completed, for after the war the laboratories of the Calico Printers' Association in Manchester developed another new mineral fibre called 'Terylene', the American production rights of which have been sold to Dupont, who manufacture it in the United States as 'Dacron'.

Other man-made fibres now in production include 'Fibrolane', which has many of the properties of wool—for example a soft, warm texture, good recovery from creasing, and absorbency. It is made from casein, a waste-producer of milk; 'Courlene', used, among other things, for stiffening garments; and 'Saran', a fibre used largely for car upholstery.

Two examples of the new arcylic fibres about to be produced on a commercial scale in the United Kingdom are 'Courtelle' and 'Acrilan'. Others synthetic, or rather semisynthetic, fibres are being made from alginates, which are the most valuable product of Scottish seaweeds.

Because it is an industry, or group of industries, of recent origin demanding much research and a great deal of capital investment, the manufacture of synthetic fibres is an undertaking concentrated in a small number of very large firms. Its dual origin is apparent from the fact that these firms have their roots in either the chemical or the traditional textile industries; but this manufacture has the advantage of modernity and has therefore not been localized. There are .production plants in the Midlands, Lancashire, South Wales, North Wales, and Northern Ireland. The production of synthetic fibres is not, however, dissociated from the processing of natural fibres. The two undertakings are closely linked for when a synthetic fibre has left the producer's works it is still a raw material, and must be turned into manufactures by the machinery of the traditional textile industries.

Students of Textile Technology get training



Phenomenal is the progress of China's industries and in textiles the progress is magnificent.

CHINA'S TEXTILE INDUSTRY

CHINA'S cotton yarn output jumped by an estimated 2.05 million bales to reach the all-time high of 6.8 million bales in 1958. This is 1.03 million bales more than total increase registered in the First Five-Year Plan and half a million bales more than the increase in the U.S. over a period of 20 years.

China's output of cotton textiles outstripped that of Britain in 1958.

Other successes in China's textile industry can be seen from the table below.

Seven thousand new varieties have been added to the long list of textiles. In the biggest textile centre Shanghai, the number of new products in the first half of last year was more than double the total turned out during the whole year of 1957.

An outstanding achievement of the textile industry last year was the widespread technical innovations movement. Workers, technicians and administrative functionaries had displayed bold initiative in working out high-efficiency, labour-saving and simplified machines and techniques. Noteworthy achievements have been made in such up-to-date techniques as pneumatic shuttleless weaving and centrifugal spindles.

The present output per 1,000 spindles an hour in the cotton mills of Shanghai, whose textile industry accounts for one-third of China's cotton spindles, has reached the world's highest level. Shanghai produces an average of 19.4 kilogrammes of 30-count cotton yarn per 1,000 spindles an hour as against only 15.5 kilogrammes in the United States. Other countries in the world produce in general from 22 to 23 kilogrammes of 21 count cotton yarn while Shanghai turns out an average of 31.8 kilogrammes.

In silk industry, China has turned out raw silk of Six A Grade, up to the world's most advanced standard. In the manufacture of tussah silk China has surpassed Switzerland. China's output of tussah silk comes to 80 per cent of the world's output. Many woollen fabrics produced in China including high quality gaberdine, embossed and striped woollen materials reach the level of similar British products of famous brands.

Alongside the big modern textile mills in the cities, spinning and weaving with locally devised spinning wheels and looms are being widely popularised in different parts of China, especially in the people's communes.

A FEW FIGURES

	—	1949	1952	1957	1958
Cotton Yarn (Million Bales)	In 1933 2.447	1.803	3.618	4.650	6.800
Cotton Cloth (Million Metres)	In 1936 2,787	1,889	3,829	5,050	6,407.8
Woollen Fabrics (Million Metres)	In 1947 7.509	5.437	4.233	18.170	23.590
Silks (Million Metres)	In 1931 144	50.16	64.76	144.56	190.00

—This shows the peak pre-liberation year; 1949 is the year of liberation from the Kuomintang rule; 1952 is the year before the First Five-Year Plan; 1957 is the final year of the First Five-Year Plan; 1958 is the first year af the Second Five-Year Plan.

India's place in the import trade of Aden is significant: India stands second in imports.

COTTON AND RAYON TEXTILES

JAGAT SINGH

Commissioner for the Government of India, Aden

India has always featured prominently in Aden's import trade. This has partly been due to India's intimate connections with Aden, which formed administratively a part of India till 1937. Geographically, also, India is not far distant from Aden, and the sea communication between Aden and Bombay is frequent and firmly established.

During 1957 India stood second in imports, after the U.K. In the early months of 1958, India's position went down to the third and fourth place. But during September and October India took the first place in the matter of imports. During November (for which latest figures are available) India was again in the second place.

Cotton and Rayon Textiles

While, statistically, India occupies a significant place in the import trade of Aden, it may be mentioned that Indian imports consist mainly of two commodities, namely, cotton textiles and rayon textiles, which together form about 70 per cent of the total Indian imports. Hence, if India's trade in these two commodities are affected, there will be a big drop in the position India now holds in the import trade of Aden. Another important commodity imported from India is tobacco (unmanufactured). About 70 per cent of imports of this commodity comes from India. Other commodities imported from India include spices, tea, sugar and coal.

Lately hardware items like door-handles, buckets, etc., and light engineering goods like electric fans, sewing machines, have also shown a marked tendency to impinge upon this market.

Exports to India from Aden consist mainly of petroleum products.

India's Competitors

Our comments with regard to the various commodities which are either imported from India to Aden, or where prospects for import exist, are as follows :—

Rayon Textiles—This commodity is mainly imported from India and Japan and to lesser extent from France, Syria and Lebanon. During the early months of 1958, Japan used to be the largest supplier of rayons, but Indian imports increased considerably from June, and now India (70 per cent by value) is the largest supplier of this commodity.

Cotton Textiles—It forms the next largest commodity imported from India, constituting about 24 per cent of total imports form India. About 75 to 80 per cent of total imports of cotton textiles into Aden come from India. Indian cotton textiles are chiefly grey sheetings.

Ready-made Garments—India is importing into Aden ready-made garments made of khaki cotton drill and grey sheeting in khaki colours, for local consumption and for re-export to the neighbouring countries. As regards poplin shirts and white and coloured drill pants (other than khaki); these are largely imported from Japan and Hongkong, since their prices are low. It has been pointed out that the products of Japan and Hongkong have been able to make considerable headway in the local market not only because of their cheapness, but also because of attractive packing and satisfactory tailoring.

Hosiery Goods—India is the major supplier of woollen hosiery items such as pullovers, mufflers, sweaters, etc., for the Colony and through it to the neighbouring countries.

As for cotton and rayon hosiery goods, the products of Japan and Hongkong are popular because of their cheapness and attractive designs. Hence, if Indian cotton and rayon hosiery goods are to find a market in Aden, their prices should be reduced so as to make them competitive with those of Japan and Hongkong.

Handicrafts and Handloom Products

There is a small but steady demand for various types of handicrafts, cottage industry products and handloom goods. This demand is being met by imports mainly from India, Hongkong and Japan. Separate statistics of these products are not available. The purchasers of these goods are chiefly tourists.

In this connection it may be mentioned that the main apparel of the local people being 'lungi', there is considerable scope for import of handloom silk lungis. The price should be sufficiently attractive to the common man, and hence it should be as low as possible. ★

Due to severe Japanese competition, there is a fall in rayons goods. But textiles import into Africa will rise.

INDIAN TEXTILES

F. M. De MELLO KAMATH

Trade Commissioner for India, Mombasa

Indian exporters must adapt themselves to changing needs. The Indian rayon industry is aware of the fact that rayons are replacing cotton in East Africa but has made no effort to claim a share of the Market. Again, the Indian textile industry knows that the trend is away from greys and towards processed goods. But nothing has been done to place what the African wants within his reach. On the other hand, the resilience of the Japanese manufacturer under the crippling blow inflicted by the increase in the customs tariff in May 1958 was shown by a fall in rayon but a rise in cotton import.

The following figures of imports through Mombasa of Japanese textiles illustrate this :

Commodity	Value of imports in £ during November 1958	January-November 1958	November 1957	January November 1957
Rayon textiles ...	142,731	1,050,830	116,435	1,261,111
Cotton textiles...	53,995	636,659	72,765	378,571
Clothing ...	35,406	279,556	26,737	155,791

Cotton Piecegoods (Grey)—Imports of greys from India in 1958 are estimated at 25 m. yards as compared to 35 m. yds. in 1957. Due to an increase in local production and a shift in consumer preferences to dyed and printed goods, imports from India in 1959 are not expected to improve over 1958.

Coloured Piecegoods—Imports in 1959 of this item (yarn dyed cloth) which includes coating, bedticking, gadlapet, striped and checked shirting, lungis, kikoys, etc., will be on a diminished scale. In this category keen competition from Japanese spun rayon materials will be felt.

Printed Goods—Cotton prints, the largest item in the import of textiles, have virtually gone out of India's hands. Here again, the attractive designs and colours of Japanese rayon fancy prints are responsible for the decline in India's exports. However, discriminating buyers still ask for cottons. It is possible that the import of printed cottons will show an increase in 1959. As Indian printed goods are neither competitive in price nor comparable in quality to Japanese cottons, it is a moot point whether India can take advantage of this demand.

Dyed Cottons—(Khaki drill, headcloth, black leopard, etc.) The U.K. is the largest supplier of khaki drill. Local production of khaki drill and headcloth is offering competition and in 1959 more is expected, as the ex-factory price of khaki drill is about Sh. 3/- per yd. and headcloth Sh. 2/45. In other dyed cottons, India remains the largert supplier and no serious competition is expected.

Blankets—(Cotton, woollen, mixed). India is the largest single supplier of cotton blankets with 40 per cent. Japan is in the market for both cotton and mixed blankets with the cotton look. It is feared that India will suffer a setback from these cheap mixed blankets which look like cotton blankets.

Woollen and mixed types of blankets are becoming increasingly popular, and Indian manufacturers are invited to export.

Clothing—Imports of this item (shirts, coats, trousers, workmen's clothes, etc.) are on the increase. The largest item is shirts, which account for more than £1m., 80 per cent coming from Hong Kong, and 10 to 15 per cent from Japan. No change in the direction of trade is expected for shirt in 1959. Hong Kong prices are the lowest, unlikely to tempt India.

Hosiery—Imports of hosiery from all sources have gone down and will continue to go down owing to the phenomenal increase in protection to the local industry. It is likely that many hosiery factories will be set up in East Africa in the near future. At present there are two in Nairobi. A third is to be set up in Dar-es-Salaam, and a fourth in Mombasa.

The Nyanza Textile Mill at Jinja (Uganda) reached 8 m. yds. production in September 1958. It is expected to reach its full rated capacity of 10 m. yards in 1959. Three more textile mills are to be established—two in Dar-es-Salaam and one in Mombasa—more or less on the Jinja pattern.

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India's major export to Canada is grey unbleached sheeting.

INDIAN TEXTILES IN CANADA

M. K. ROY

First Secretary (Commercial) Ottowa

There is little doubt that our hessian (burlap) is receiving strong competition in some fields from other materials, notably multi-walled paper bags and more recently plastics. Indian burlap in the field of light and medium packaging especially at the retail level has been slowly replaced by paper and plastic bags though at the producer level burlap bags are still used. As a backing for linoleum, carpets and other similar uses, burlap is competing againt rubber as a packing for these commodities. In the last few years, bulk shipping of materials previously packed in burlap bags has also operated to make competition much stronger for burlap. These innovations have been partially offset by custom, by the reclaim value of the burlap bag and by the buoyant condition of the Canadian economy.

Indications point to the necessity of setting up a versatile advertising agency in Canada to offset the present trend and find new uses for burlap. One such Council for both Canada and the U.S.A. seems no longer sufficient to do justice to publicity needed in Canada.

India's major exports to Canada are of grey unbleached sheeting which is used in that state or processed into coloured materials. The Canadian textile industry has appeared before the Canadian Tariff Board in a lengthy comprehensive and costly hearing to place before the Board its case for increased tariff protection. The outcome is not yet known. From this it is clearly evident that the Canadian textile industry is determined at considerable cost to maintain its earnings and to combat competition from whatever source. Japan is one of our strongest competitors and seems to be growing in strength year by year. She seems to be able to provide better quality at lower prices.

In the eight-month comparison for which actual figures are available, India's exports of " Cotton Fabrics Not Bleached NOP ", has declined from 1,935,439 pounds valued at $844,113 in 1957 to 1,587,774 pound valued at $653,060. In coloured fabrics and in manufactures of cotton textiles, the competition is even more intense. Alternate new uses must be found for our cotton textiles especially during the period that India is equipping herself to compete more vigourously. Despite the strong competition, there is still room for Indian cotton toxtiles so long as prices are competitive and terms of business as well as deliveries are favourable. ★

Here is a fine account of a great industry of a great nation.

TEXTILE INDUSTRY IN THE USSR

G. GRIGORYEV

The textile industry in Russia dates from the 16th century, its progress at first was slow but in the 19th century, it made rapid headway.

Before World War I Russia's textile industry had about 9,000,000 spinning spindles and over 224,000 weaving looms. Approximately half a million workers were employed in it. But the majority of textile mills were owned by foreigners, and this dependence upon foreign capital was felt to a still greater degree because of the fact that Russia did not produce looms and spindles and had to import them.

Almost the whole of the textile industry was concentrated in Moscow and Vladimir regions. After the October Revolution the textile industry began to develop in the Union republics in Central Asia and Trans-caucasia.

The reconstruction of industry and agriculture along socialist lines made it possible to change the correlation between export and import of raw materials and machinery. While the pre-revolutionary Russia received about a half of its cotton from abroad, in 1930 the imported raw material made up a little more than 6 per cent.

The increase in raw material resources helped the development of the textile industry and textile mills were set up in Uzbekistan, Azerbaijan, Georgia and Armenia. In Uzbekistan alone, which had no textile industry at all before the Revolution, the pre-war production of cotton fabrics was as high as 107,000 thousand metres.

To form an idea of the development of the Soviet textile industry, one should cast a glance, for instance, at the history of the

Krasnaya Talka mill in Ivanovo. The construction of the mill began in 1927 and 120,000 spindles were already in operation three years later.

The machine-making industry was being developed in the Soviet Union at the same time. For instance, the mill received the speed frames from the Leningrad Mechanical Engineering works.

The output of looms increased annually and the production was constantly perfected.

Already by 1940 eighty per cent of the spinning machinery had been modernized. New equipment made it possible to start the production of new kinds of yarn. In 1951 the Krasnaya Talka mill started the production of rayon staple fibre yarn.

Improvements made in the equipment, operation processes and organization of labour and the growth of the workers' skill have drastically changed production rates at the mill.

During the quarter of a century the production increased by more than four times. The productivity of the machines is now 656 kilogram/counts per 1000 spindle/hours for cotton yarn and 836 kilogram/counts for rayon staple fibre yarn.

Krasnaya Talka mill is not an exception. The whole textile industry of the USSR grew up in the same manner.

Preparations are now under way for all-round automation of operations in textile mills. For instance, the design of an automatic finishing mill in Gorodishche has been made. It is planned to introduce a continuous production flow with different methods of fabric finishing. All the processes at the mill from unloading of cotton to the loading of finished products in waggons will be fully automatised. Chemical plant, auxiliary equipment, ventilating, heating, and power plants and, finally, water-supply and sewage works will also be completely automatised. Over-all mechanization of the mill's inner handling is envisaged.

At the automatic production lines, use will be made of the steam lye boiling and the peroxide bleaching of the fabrics, high-speed stentering and drying at high temperatures, photo-cell quality control and mechanized packing.

The production processing lines will be controlled from the central control panels. All the machines are being equipped with control and metering eqipment, the readings of which will be transmitted to the central control desk. Industrial television sets will also be used; 14 cameras will transmit the image to control panels.

The organization of such automatic mills will considerably increase labour productivity, reduce costs of production and improve the quality of the manufactured goods.

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The joy that gleams in her eyes speaks volumes about the prosperity she is surrounded with in VSSR.

The many problems facing this vital industry are analysed by the author with vision and courage.

INDIAN JUTE MILL INDUSTRY

J. I. JAMIESON

Chairman, Indian Jute Mills Association, Calcutta

The Indian jute industry was faced with near-crisis conditions when, as a result of partition, the manufacturing mills in and around Calcutta found themselves cut off from about three-quarters of their raw material supplies. Added to this, the devaluation of the Indian currency in 1949 created formidable problems of raw jute supply owing to the exchange crisis *vis-a-vis* Pakistan. As a corollary, prices rose steeply, and, as if this were not enough, the Korean war supervened to bring about a boom and push up prices further. Price controls were imposed, but so too were heavy export duties. Consequently, the large profits which the industry might have earned during this peroid and with which it might have re-equipped itself with modern machinery were diverted elsewhere. The high prices prevailing at this time had other repercussions. From all sides came the news of the introduction of bulk-handling plant, of new methods of consumer packaging, of the growth and manufacture of new fibres and of the establishment of new and the re-equipment and expansion of existing jute industries in other countries. After a succession of cuts in the rates of export duty, starting from 1952, the duties were eventually abolished entirely in 1955, and the industry was now able to address itself earnestly to the task of restoring its fortunes. Meantime, the jute industry in Europe, entirely unfettered by export

duties and aided in some cases by Government subsidies, had been able to take advantage of the high prices in the boom period to finance its rehabilitation, with the result that the Indian mills found themselves with a considerable leeway to make up.

Main problems of industry

The main problems facing the Indian jute industry at this stage—all of which were already being tackled—might be stated as follows :—

(1) To secure its raw jute supplies by increased production of jute within the Indian Union, with self-sufficiency as the goal: in addition, to improve the quality of the jute grown in India so as to bring it up to the general standard obtainable in the jute growing areas of Pakistan;

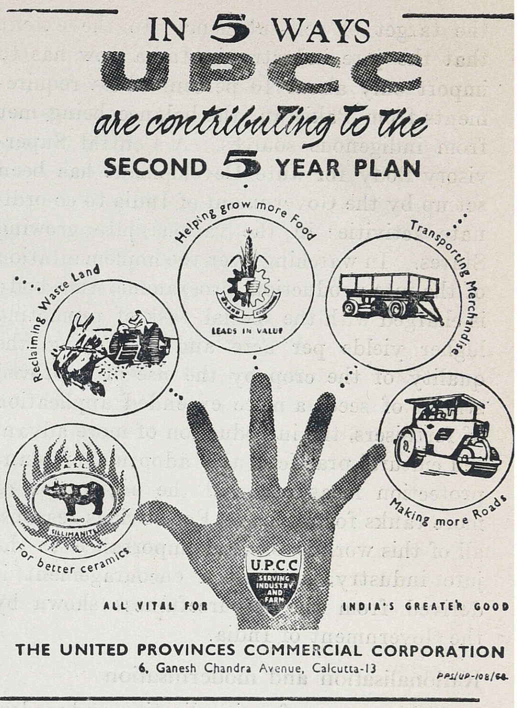
(2) To rationalise the industry's production techniques by installing up-to-date plant and machinery, by taking advantage of the latest develepments in jute technology, and by concentrating on the manufacturing potential in the more efficient, modernised units;

(3) With the aid of the measures referred to under (1) and (2), to reduce costs and stabilise prices at levels attractive to overseas consumer ;

(4) In conjunction with the foregoing, to pursue an energetic export promotion programme with a view to capturing lost markets and maintaining and expanding existing markets: and

(5) To diversify the pattern of the industry's production and to seek new uses for jute.

Despite the very great handicaps imposed by the various factors already mentioned, the Indian jute industry has made remarkable



progress in the pursuit of these five major objectives and has thus once again demonstrated its fundamental solidarity, its resilience, its flexibility, and its very high organisational abilities.

Raw jute production Augmented

With regard to raw jute production, the Government of India has long recognised the urgent need lessening India's dependence on Pakistan and has pursued a vigorous policy aimed at achieving selfsufficiency in as short a time as possible.

Making due allowance for adverse weather conditions, which can be responsible for very wide fluctuations in the jute crop, and taking into account also the variations in the acreage sown according to the relative advantages of rice and jute production, it will be seen that rapid progress has been made towards

the target of self-sufficiency, to the extent that the jute industry in India now has to import only about 10 percent of its requirements from Pakistan, the balance being met from indigenous sources. A Central Supervisory Body for Jute Development has been set up by the Government of India to co-ordinate activities in the various jute growing States. In watching over the implementation of the jute production programme, this body is charged with the special task of promoting higher yields per acre and improving the quality of the crop by the use of improved strains of seed, a more extended application of fertilisers, the introduction of more advanced cultural practices, the adoption of plant protection measures, and the excavation of more tanks for retting. For obvious reasons, all of this work is of vital importance to the jute industry, and much encouragement is derived from the resourcefulness shown by the Government of India.

Rationalisation and modernisation

The process of rationalisation and modernisation of the industry has been proceeding gradually but steadily for a number of years, and here again the industry is indebted to the Government of India for its assistance in the form of loans made available through the National Industrial Development Corporation. "Modernisation" in this context does not involve the complete replacement of the industry's plant and machinery. Despite the heavy demands made on it during the war years, and the difficulties then experienced in maintenance, the machinery of the industry is in general well looked after, efficient, and capable of good production, but re-equipment is essential in the preparing and spinning departments where the use of modern machines and methods can give a much improved efficiency and help to reduce manufacturing costs. In that limited sense of "modernisation", the industry has made very good progress to date, having already fulfilled over 50 per cent of the programme. Further plans have been blue-printed by several mills, and there are a number of applications for loans for modernisation pending before the N.I.D.C. With the introduction of treble shift working of the new machinery already installed which is essential in view of the heavy capital outlay on the machinery, the number of looms served by these modern preparing and spinning techniques is being automatically increased, and it is estimated that, within another two to three years, about 75 per cent of the industry's modernisation project as a whole will have been implemented.

Production by more efficient units

Another important aspect of the rationalisation of the industry lies in the closure of inefficient units and the transfer of production to sister concerns with modern machinery. This process of concentration has been witnessed particulary in the last two years, and, it must be stressed, has been accomplished without affecting the total production of the industry and with very little impact on the labour. This has been made possible by the well-knit organisation of the industry within the framework of the I.J.M.A.'s Working Time Agreement, under which a mill's weekly allotment of loom hours can be transferred to and utilised by another unit. The Working Time Agreement is the instrument which regulates the production of the industry in accordance with the world demand for jute goods and its value as an integrating factor and as a bulwark against excessive production cannot be overemphasised.

Outlook brighter

The justification for rationalisation, in all its forms, is to be found in the extent to which it can lower production costs and put

the industry on a competitive footing. In recent years, many mills have incurred heavy losses as a result of unprofitable working; but the pendulum now appears to be swinging the other way, largely as a result of the benefits slowly accuring from the modernisation programme on which the jute industry has embarked, and the outlook for the future is a little brighter.

Market development activities

Being an export industry, to the extent of 80 per cent of its output, the jute industry is extremely sensitive to the changing conditions in the world market and is continually exercised in studying consumer trends and economic developments which are likely to affect the consumption of Indian jute products one way or the other. Since 1949, the industry has spent increasingly large sums of money each year on market development and public relations, and the Government of India has come to its aid with generous grants for this purpose. The I.J.M.A. maintains branch offices in the U.K. and the U.S.A., the former being responsible for liaison work in the European theatre and the latter undertaking similar activities in the U.S.A., Canada and Central and South America. In addition, I.J.M.A. goodwill missions have visited many of the industry's important markets in recent years, these missions being supplemented by Indian Government trade delegations on which the jute industry has been represented, and increasing attention is being paid by both the industry and Government to this important aspect of export promotion. Last year, a jute trade delegation visited Australia and New Zealand and many other important markets in South East Asia. Furthermore, press publicity and advertising in other media are financed by the I.J.M.A. in varions countries, while samples of the industry's products are to be found on display each year at trade fairs and exhibitions all over the world. The Government of India also keeps the Association informed of important developments in its markets by relaying reports received from the Indian Government Trade Commissioners and commercial representatives abroad. In these and many other ways the industry is kept in constant and close touch with its consumers.

Diversification of production

It has been recognised, however, that some markets have been irretrievably lost, mainly on account of the establishment of jute industries in foreign countries, designed to cater for indigenous requirements previously served by the Indian jute industry and also to some extent on account of the adoption of bulk handling methods. Although world agricultural production has gone up, this has not been accompanied by a commensurate increase in the use of jute goods for packaging purposes. These facts all point to the need for diversifying the jute industry's production and exploring new uses for jute goods. The I.J.M.A. is very much alive to this situation, and has a number of experimental projects in hand. Of special interest is the current investigation into the possible use of a hessian/asphalt lining in irrigation canals in the U.S.A. This represents a very large potential market for jute fabrics, and if a suitable jute reinforced lining is successfully developed and accepted by the U.S. Government, it should be possible to exploit its use in other countries. Another use for jute cloth has already been established commercially in the form of a backing for tufted carpets, and a considerable quantity of this cloth is now being produced by the jute industry. This further demonstration of the versatility of jute gives added encouragement

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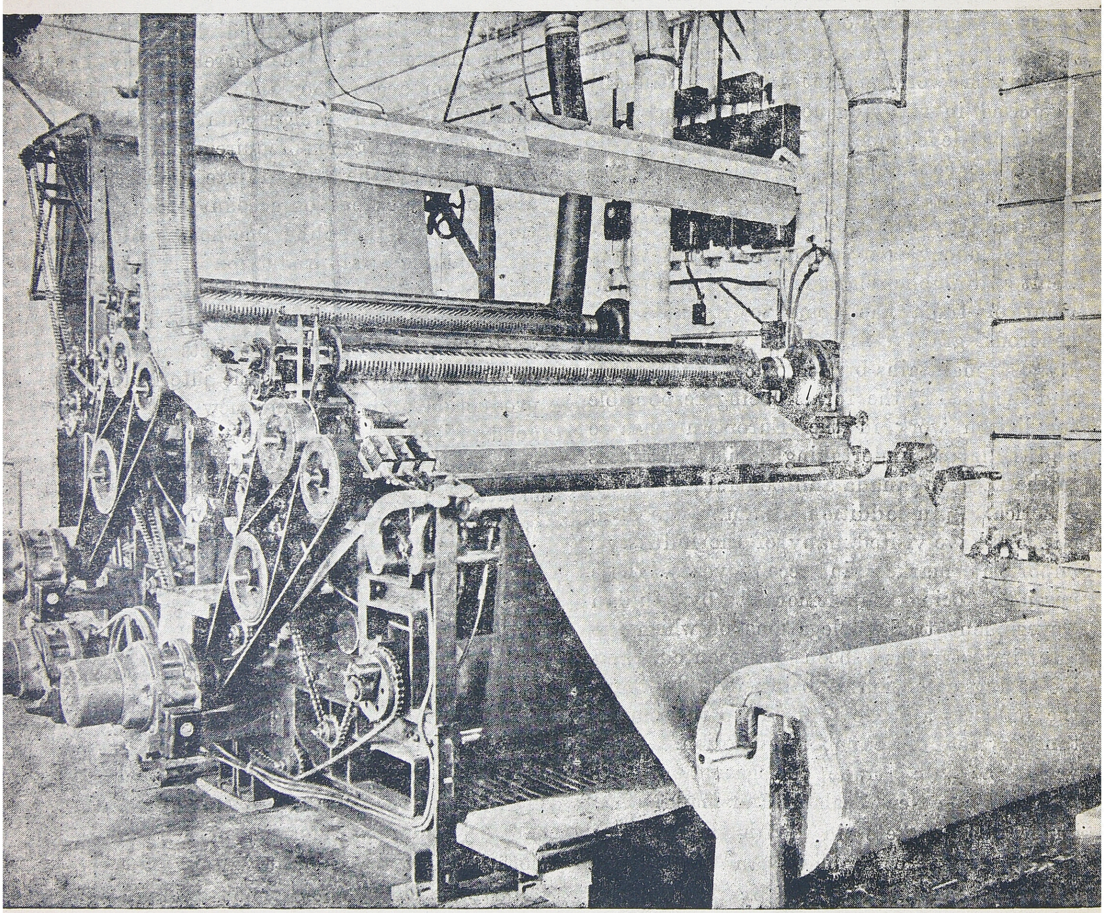
to the efforts now being made to develop new products.

India's total export of jute goods is currently at the rate of over 850,000 tons a year, and the target envisaged in the Second Five Year Plan is 900,000 tons. The general trade recession in recent months has retarded the jute industry's drive towards this target, but there are indications that the worst effects of the recession may be behind us. If that proves to be true, the jute industry will, I am sure, attain its immediate objective within the allotted time, and from that point will seek still further opportunities to expand its trade. ★

Carpets made soft and covetous